Inventor: Yu Jing TING

Title: IMPROVED TURBO DECODER

Page 1 of 16

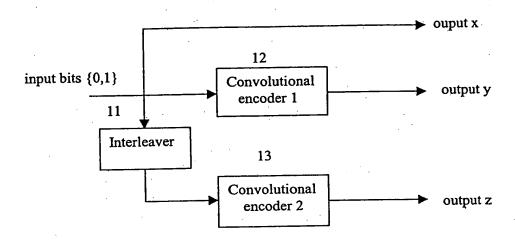


Figure 1 Basic Architecture of Turbo Encoder (Coding Rate == 1/3)

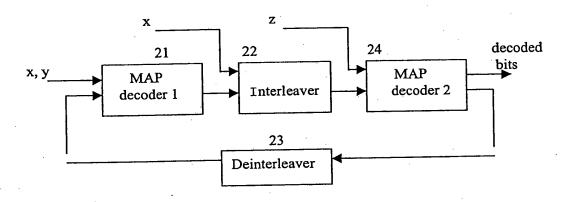


Figure 2 Basic Architecture of Turbo Decoder (Coding Rate == 1/3)

Attorney Docket No.: 37042-191882 Inventor: Yu Jing TING Title: IMPROVED TURBO DECODER Page 2 of 16

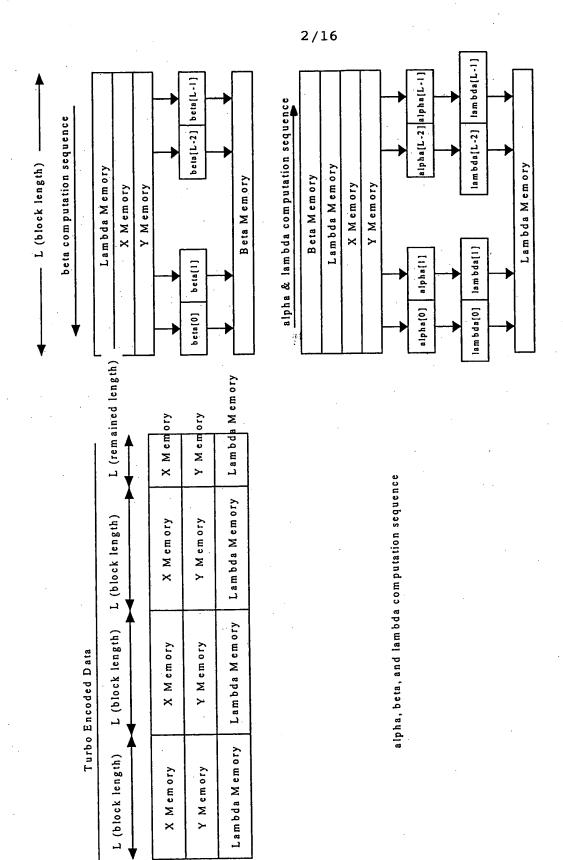


Figure 3. Alpha, Beta and Lambda Calculation Sequence

Attorney Docket No.; 37042-191882 Inventor: Yu Jing TING Title: IMPROVED TURBO DECODER Page 3 of 16

3/16

७ 7 ~ State Transition in Beta Computation S 7 0 4 0 0 Next[m][0] N ext[m][1] State m

S 7 n 0 State Transition in Alpha Computation 9 S 7 3 0 prev[m][1] prev[m][0] State m

Figure 4 State Transition in Beta and Alpha Computation.

Inventor: Yu Jing TING
Title: IMPROVED TURBO DECODER

Page 4 of 16



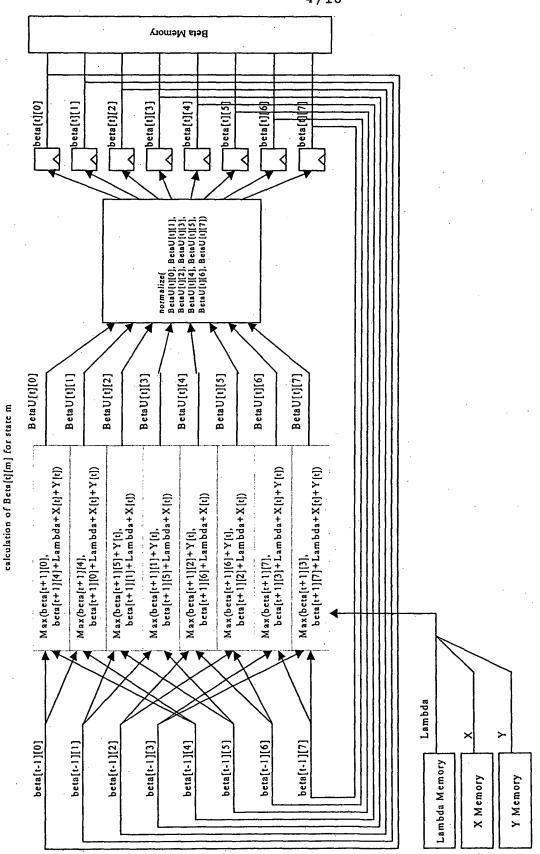


Figure 5. Beta Computation Block Diagram

Attorney Docket No.: 37042-191882 Inventor: Yu Jing TING Title: IMPROVED TURBO DECODER Page 5 of 16

5/16

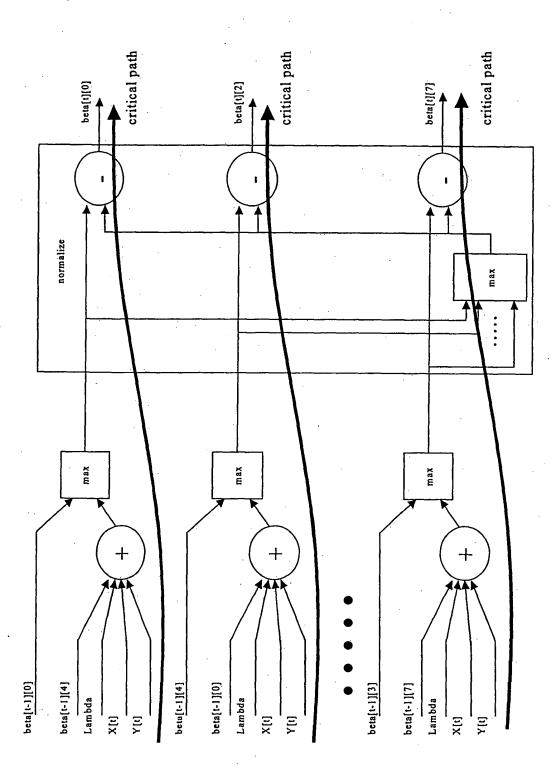


Figure 6 Details Beta Computation and Critical Path Block Diagram

Attorney Docket No.: 37042-191882 Inventor: Yu Jing TING Title: IMPROVED TURBO DECODER Page 6 of 16



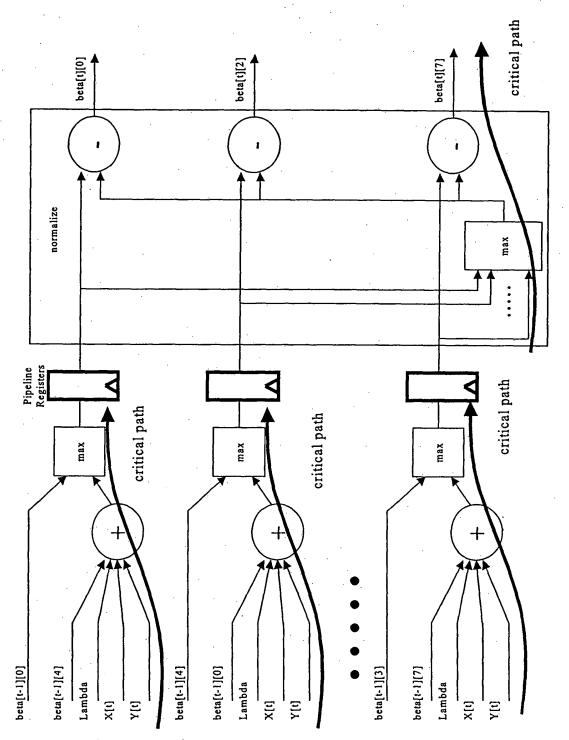


Figure 7: The Improved Structure of Beta Computation and Critical Path Diagram

Inventor: Yu Jing TING
Title: IMPROVED TURBO DECODER
Page 7 of 16

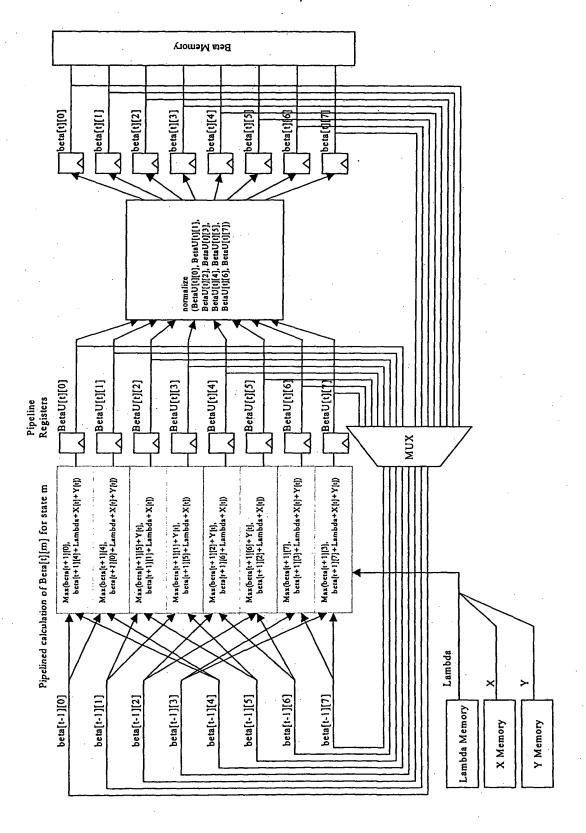


Figure 8 Overall Structure of Pipelined Beta Computation Path Diagram

Attorney Docket No.: 37042-191882 Inventor: Yu Jing TING

Title: IMPROVED TURBO DECODER

Page 8 of 16

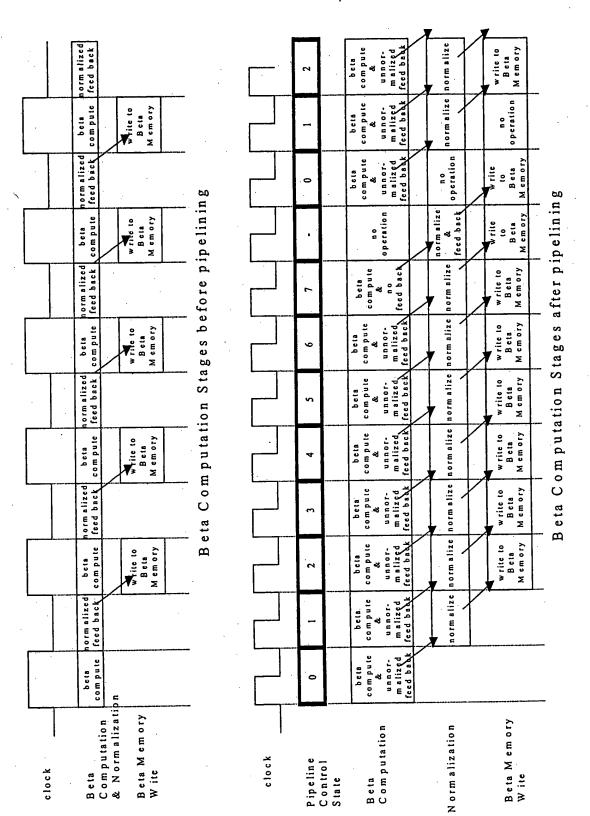


Figure 9 The pipeline Stages of Beta Computation Diagram

Attorney Docket No.: 37042-191882 Inventor: Yu Jing TING Title: IMPROVED TURBO DECODER Page 9 of 16



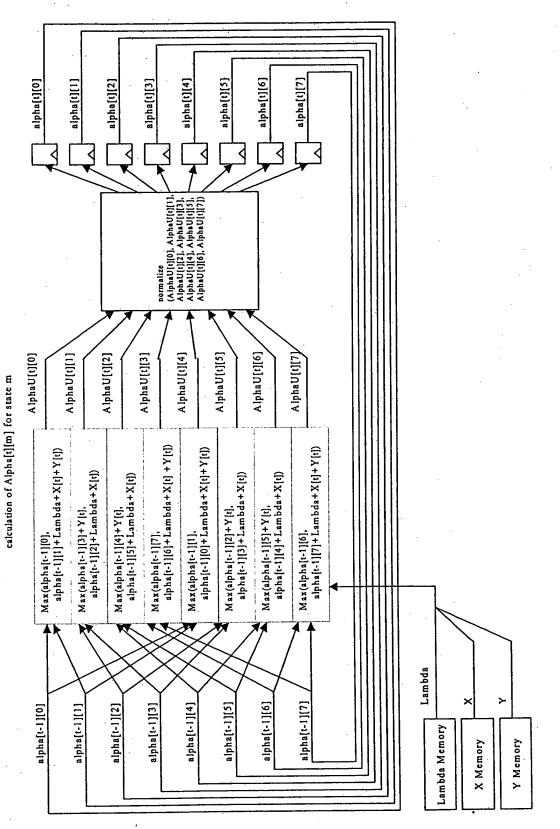


Figure 10 Alpha Computation Block Digram

Attorney Docket Nq.: 37042-191882 Inventor: Yu Jing TING Title: IMPROVED TURBO DECODER Page 10 of 16

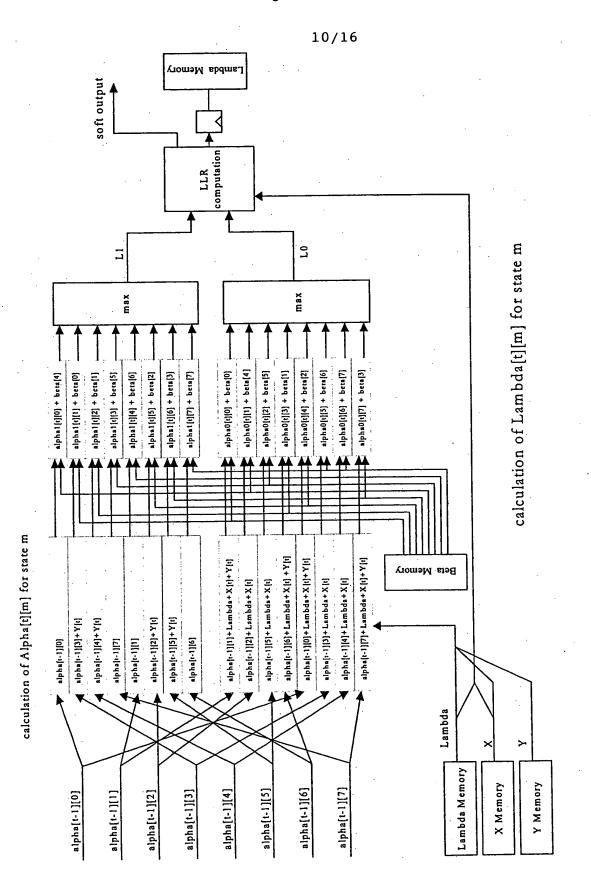


Figure 11 Lambda Computation Block Diagram

Attorney Docket No.: 37042-191882 Inventor: Yu Jing TING Title: IMPROVED TURBO DECODER

Page 11 of 16

11/16

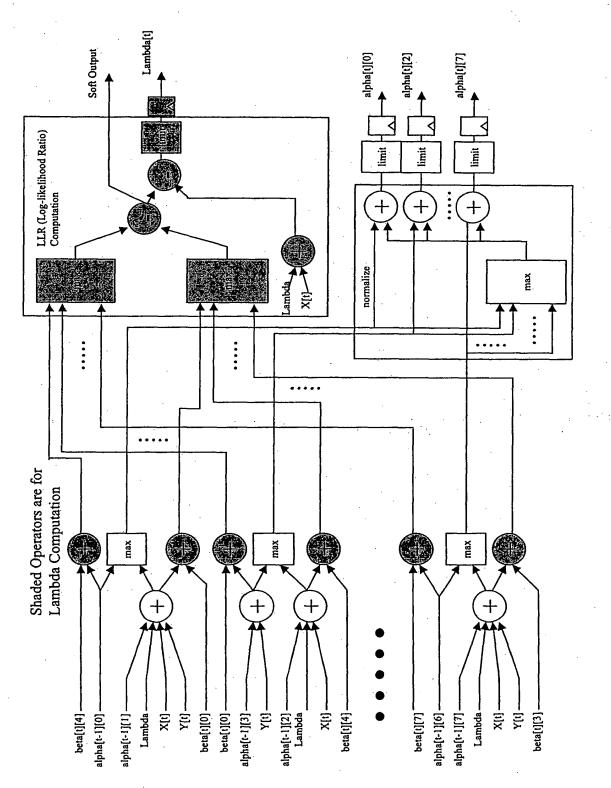


Figure 12 Details Alpha and Lambda Computation and Critical Path Block Diagram

Attorney Docket No.: 37042-191882 Inventor: Yu Jing TING Title: IMPROVED TURBO DECODER Page 12 of 16

12/16

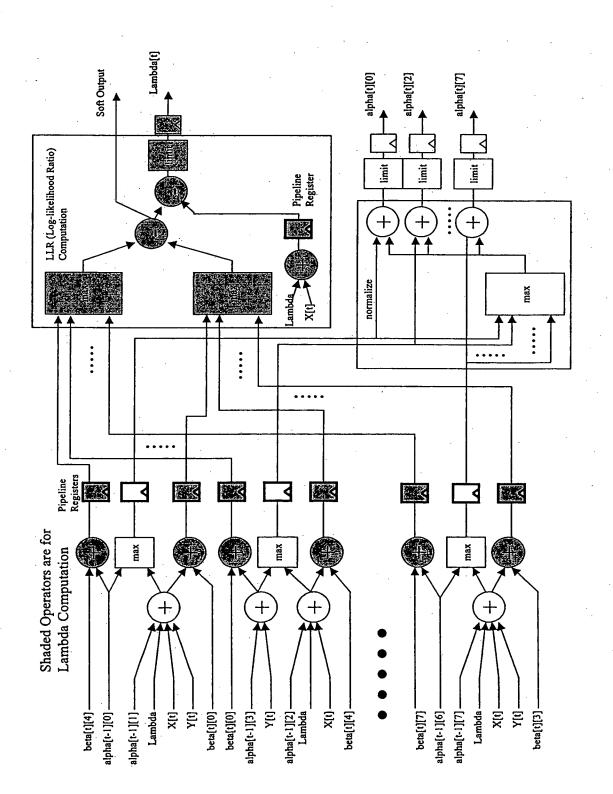


Figure 13 Improved Structure of Alpha and Lambda Computation and Critical Path Diagram

Attorney Docket No.: 37042-191882 Inventor: Yu Jing TING Title: IMPROVED TURBO DECODER

Page 13 of 16

13/16

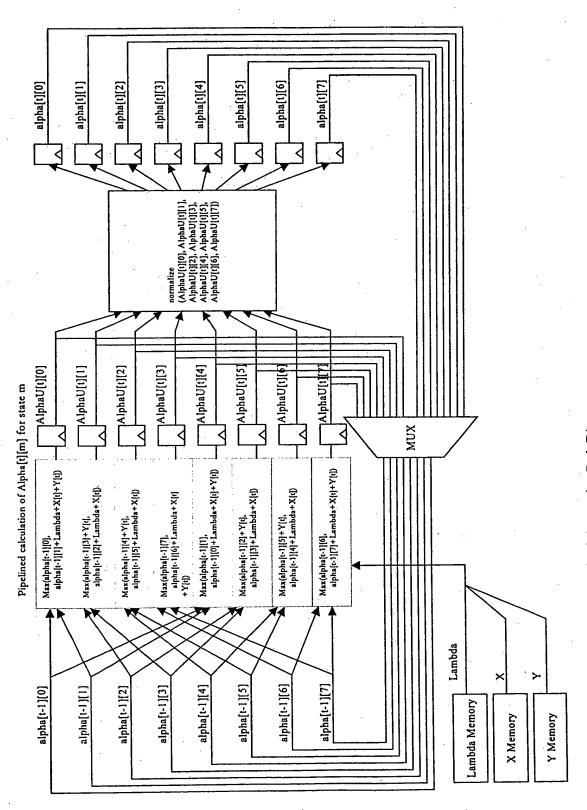


Figure 14 The Overall Structure of Pipelined Alpha Computation Path Diagram

Inventor: Yu Jing TING
Title: IMPROVED TURBO DECODER Page 14 of 16

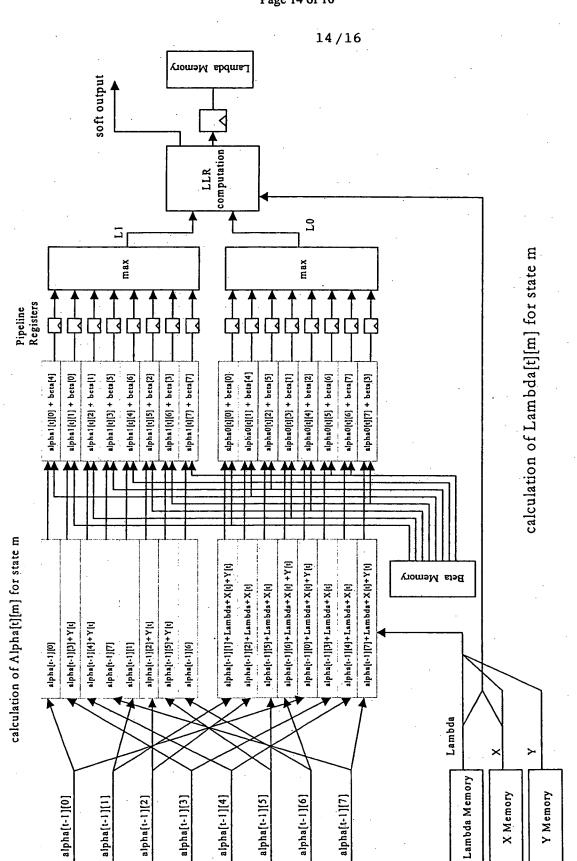
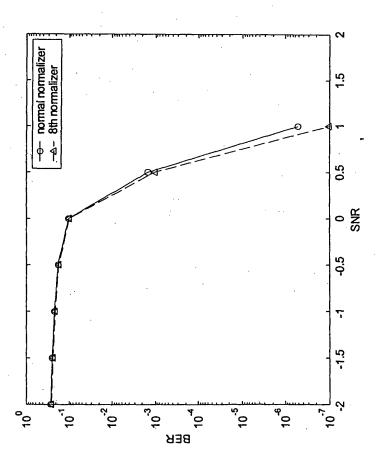


Figure 15 The Overall Structure of Pipelined Lambda Computation Path Diagram



igure 16 BER and SNR simulation for original normalization and new normalization Block length = 3856 bits)

Attorney Docket No.: 37042-191882 Inventor: Yu Jing TING Title: IMPROVED TURBO DECODER Page 16 of 16

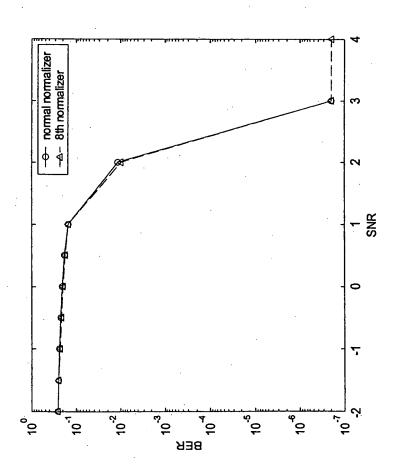


Figure 17 BER and SNR simulation for original normalization and new normalization (Block length = 5114 bits)